

Article V.—THE SPECIES OF *HOLCASPIS* AND THEIR GALLS.

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PLATES VII-IX.

The present paper on the species of *Holcaspis* constitutes the second installment of a series of papers on the North American Cynipidæ and their Galls, which are in course of preparation, the first part being a paper on 'The North American Species of *Rhodites* and their Galls,' published in this Bulletin, Vol. XXIII, 1907, pages 629-651, plates xliii-xlvii.

***Holcaspis* Mayr**

Holcaspis MAYR, Gen. Gallenb. Cynip., 1881, pp. 9, 35; CRESSON, Synop. Hymen. N. Am., pt. I, 1887, pp. 25, 33; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 53; ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 62; Psyche, Vol. X, 1903, p. 153.

Agamous. Antennæ 13-14-jointed, first joint stout, second joint very short, stout, third to eighth joints long and slender, gradually decreasing in length, ninth to terminal joints short and somewhat thickened. Head thorax and part of abdomen pubescent. Mesothorax with incomplete parapsidal grooves, abbreviated anteriorly or continuous. Scutellum rounded, convex and without distinct foveæ at the base.

Type: *Callaspidia globulus* Fitch.

***Holcaspis globulus* (Fitch).**

Cynips oneratus (in part) HARRIS, Rep. Ins. Mass. Inj. Veget., 1841, p. 398; Treat. Ins. New Engl. Inj. Veget., 2d edit., 1852, p. 434; Treat. Ins. Inj. Veget., 3rd edit., 1862, p. 548; *ibid.*, new edit., Flint, 1862, p. 548; *ibid.*, 1863, p. 548; *ibid.*, 1880, p. 548 (gall only).

Callaspidia quercus globulus FITCH, 5th Rep. Nox. Ins. N. Y., 1859, (Trans. N. Y. State Agric. Soc., 1858 (1859), p. 810, fig.; GLOVER, Ill. N. Am. Ent., 1878, pl. viii, figs. 1, 2, 3; PACKARD, Bull. 7, U. S. Ent. Com., 1881, p. 39; 5th Rep. U. S. Ent. Com., 1890, p. 111.

Cynips quercus globulus OSTEN SACKEN, Proc. Ent. Soc. Phil., Vol. I, 1861, p. 67.

Cynips q. globulus OSTEN SACKEN, Ent. Zeit. Stettin. Vol. XXII, 1861, pp. 410, 413; BASSETT, Proc. Ent. Soc. Phila., Vol. II, 1863, p. 328; WALSH, Proc. Ent. Soc. Phil., Vol. II, 1864, p. 488; PACKARD, 5th Rep. U. S. Ent. Com. 1890, p. 113.

Cynips globulus OSTEN SACKEN, Proc. Ent. Soc. Phil., Vol. IV, 1865, pp. 339, 345, 349, 350.

Diptolepis globulus KARSCH, Zeitsch. Gesammt. Naturwiss., Vol. 3rd Ser., 1880, p. 293.

Loxaulis globulus ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296.

Holcaspis globulus MAYR, Gen. Gallenb. Cynip., 1881, pp. 9, 35; ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 305; *ibid.*, Vol. XIV, 1887, p. 130; Bull. 1, Colorado Biol. Assoc., 1890, p. 38; GILLETTE, 27th Rep. Agric. Mich., 1888, p. 470; Psyche, Vol. V, 1889, p. 187; Proc. Iowa Acad. Sci., 1890, p. 113; BEUTEN-MÜLLER, Bull. Am. Mus. Nat. Hist., Vol. IV, 1892, p. 260, pl. xii, fig. 4; Am. Mus. Journ., Vol. IV, 1904, p. 105, fig. 37; Ins. Galls Vicin. N. Y., 1904, p. 19, fig. 37; PATTON, Ent. News, Vol. III, 1892, p. 104; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 56; BRODIE, Ann. Rep. Forest Ont., 1890, p. 116, fig. 24; BRIDWELL, Trans. Kan. Ac. Sci., Vol. XVI, 1899, p. 204; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 54; COOK, 29th Rep. Dept. Geol. Nat. Hist. Indiana, 1904, (1905), p. 835, fig. 27; FELT, Ins. Affect. Park and Woodl. Trees, Vol. II, 1906, p. 624; JARVIS, Rep. Ent. Soc. Ont., 1906 (1907), p. 72.

Cynips rugosa BASSETT, Can. Ent., Vol. XIII, 1881, p. 100.

Holcaspis rugosa MAYR, Gen. Gallenb. Cynip., 1881, p. 33; ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 304; *ibid.*, Vol. XIV, 1887, pp. 130, 139; GILLETTE, 27th Rep. Agric. Mich., 1888, p. 470; Psyche, Vol. V, 1889, p. 187; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 56; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 54.

Female. Head cinnamon red, broadly black in front and with a black spot behind the eye, finely punctate; antennæ 14-jointed, black, first and second joints dark rufous. Thorax finely punctate, slightly pubescent, black, subopaque, sometimes narrowly red along the parapsidal grooves, and laterally. Parapsidal grooves distinct, extending to about the middle of the mesothorax and broadly separated at the scutellum where they are somewhat converging. Anterior pair of lines parallel; lateral groove distinct. Scutellum black, evenly rugoso-punctate, foveæ wanting. Abdomen piceous black, darkest dorsally, pubescent laterally at the base. Legs reddish brown, pubescent. Wings, pale yellowish, hyaline, veins brown. Length 3 to 4 mm.

Gall. (Plate VII, Fig. 1, 2, 3; Plate IX, Fig. 12.) On the twigs of white oak (*Quercus alba*), chestnut oak (*Quercus prinus*), scrub chestnut oak (*Quercus prinoides*). Smooth, globular or the shape of a bullet, growing singly or in clusters of two, three or more. Yellow, sometimes tinged with red. Internally of a compact, rather hard, corky texture and containing a free, oval, yellowish brown larval cell, resembling an egg. Diameter 8 to 16 mm.

Habitat. Canada to Texas.

The insect described by Harris as *Cynips oneratus* is a guestfly (*Synergus oneratus*) and *Cynips globulus* of Fitch is the true gall maker. The species described by Bassett as *Cynips rugosa* is inseparable from *Holcaspis globulus*, at least I am unable to find any perceptible differences between the two species.

The types of Harris are in the Boston Society of Natural History and Bassett's types of *H. rugosa* are in the American Museum of Natural History and the American Entomological Society. Fitch's type of *H. globulus* is lost.

Holcaspis omnivora (Ashmead).

Cynips q. omnivora ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. vi.

Andricus omnivorus ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, pp. 295, 303; DALLA TORRE and KIEFFER, Gen. Ins. Hymen., Fam. Cynip., 1902, p. 64.

Holcaspis omnivora ASHMEAD, Trans. Am. Ent. Soc., Vol. XIV, 1887, p. 130; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 56.

Female. Wholly reddish brown, except the anterior pair of grooves and lateral lines on the thorax, black, pubescent. Antennæ blackish, basal joints rufous. Head finely rugosely punctate. Thorax finely and evenly punctate. Parapsidal grooves extending forward to nearly the middle of the mesothorax. Anterior pair of lines extending backward to a little beyond the middle. Lateral grooves distinct. Scutellum rugose. Abdomen shining, basal segment pubescent. Wings hyaline, veins fine, second cross-vein heavy. Areolet large. Cubitus disappearing at the middle from its origin. Length, 3 to 4 mm.

Gall. (Plate VII, Figs. 4, 5, 6, 7.) Singly or in clusters of two or three on the twigs of different kinds of oaks (*Quercus brevifolia*, *Quercus catesbæi*; *Quercus virginiana*, *Quercus minor*, and *Quercus chapmani*). Globular or irregularly rounded, sometimes confluent. Hard, pale brown or yellowish, sometimes tinged with red. Internally there is a small larval cell, sometimes loose, but more often attached to the hull near the bud axil. Diameter 8 to 20 mm.

Habitat. Florida.

The gall of this species resembles that of *Holcaspis globulus*, but the fly is almost entirely rufous while *Holcaspis globulus* is nearly black.

Holcaspis mamma (Walsh).

Cynips q. mamma WALSH, Am. Ent., Vol. I, 1869, p. 102.

Holcaspis mamma ASHMEAD, Trans. Am. Ent. Soc., Vol. XIV, 1887, p. 130; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 56; BRIDWELL, Trans. Kan. Acad. Sci., Vol. XVI, 1899, p. 204.

Holcaspis duricoria MAYR, Gen. Gallenb. Cynip., 1881, p. 35; BASSETT, Trans. Am. Ent. Soc., Vol. XVII, 1890, p. 64; GILLETTE, 27th Rep. Agric. Mich., 1888, p. 430, fig. 3; Psyche, Vol. V, 1889, pp. 187, 216, fig. 3; Proc. Iowa Acad. Sci., Vol. I, pt. ii, 1892, p. 113; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., Vol. IV, 1892, p. 261, pl. XII, fig. 5; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 54; FELT, Ins. Affect. Park and Woodl. Trees, Vol. II, 1906, p. 624.

Cynips duricaria PACKARD, 5th Rep. U. S. Ent. Com., 1890, p. 113.

Holcaspis duricaria BEUTENMÜLLER, Am. Mus. Journ., Vol. IV, 1904, p. 106, fig. 38; Ins. Galls Vicin. N. Y., 1904, p. 20, fig. 38; JARVIS, Rep. Ent. Soc. Ont., 1906 (1907), p. 71.

Diplolepis q. macrocarpæ KARSCH, Zeitsch. Gesammt. Naturwiss., Vol. V, 3d ser., 1880, p. 291, pl. vi, figs. I, Ia.

Cynips macrocarpæ DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 73.

Andricus macrocarpæ DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 63.

Female. Head rufous, face narrowly black, or sometimes black with the cheeks

rufous, very finely rugose, pubescent. Antennæ 13-jointed, black, basal joint rufous. Thorax rufous, black between the anterior pair of grooves and along the lateral lines, sometimes black with only slight traces of rufous, finely punctate, and pubescent. Pleuræ usually rufous, sometimes marked with black. Parapsidal grooves distinct, broadest at the scutellum and extending forward to a little beyond the anterior lines. Lateral lines, shining and well marked. Anterior pair of grooves distinct. Scutellum rugose, rufous, sometimes marked with black basally, foveæ wanting. Abdomen rufous or pitchy brown, hairy basally at the sides. Legs rufous, hairy. Wings hyaline, somewhat dusky, cubitus disappearing before reaching the first cross-vein; second cross-vein infuscated. Areolet large. Length 2.50 to 4.50 mm.

Gall. (Plate VIII, Fig. 1.) In numbers or in clusters among the twigs of swamp white oak (*Quercus platanoïdes*) and bur oak (*Quercus macrocarpa*). Rounded, hard, and woody when old, brown or dark red, with a more or less distinct point at the apex. When fresh it is bright red, sometimes greenish, soft and pithy. Internally there is a free larval cell, similar to that of *Holcaspis globulus*. Diameter 6 to 18 mm.

Habitat. Canada to Texas.

I have united *Holcaspis duricoria* Bassett, with *H. mamma* Walsh. The description of the gall of the latter tallies exactly with that of the former, while the brief characters of the adult of *H. mamma* agrees with those of *H. duricoria*. Walsh compared his *H. mamma* with *H. globulus* and his diagnosis agrees essentially with the material of these species before me. A specimen of *H. mamma* was given to me by the late Dr. Ashmead, and I cannot separate it from *duricoria*. Bassett also suspected that *H. duricoria* was probably identical with *H. mamma*, and his species had long borne the name as a manuscript designation before the description was published. The gall of *mamma* is sometimes found in countless numbers on a single tree.

The types of the adults and galls of *duricoria* are in the American Museum of Natural History and the American Entomological Society. The types of *H. mamma* were lost in the great Chicago fire.

Holcaspis rubens Gillette.

Holcaspis rubens GILLETTE, Ent. News, Vol. IV, 1893, p. 29; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 54.

Female. Head rufous, coarsely punctate. Antennæ dark rufous, terminal joints black. Thorax evenly punctate, rufous except the anterior parts of the two parallel lines, line at base of scutellum, sutures of thorax, sternum, and metathorax black. Parapsidal grooves distinct, widely separated at the scutellum and extending only about half way forward. Anterior parallel grooves distinct. Lateral lines long and extending well forward. Scutellum rugose, foveæ wanting but with a narrow transverse groove at the base. Abdomen globose, not compressed, shining, pubescent at sides of base, rufous, ventral sheath black. Legs rufous. Wings hyaline, veins fine, second cross-vein heavy. Cubitus not reaching the first cross-vein. Length, 4 to 5 mm.

Gall. (Plate VII, Figs. 8, 9.) Singly or in clusters on the twigs of oak (*Quercus undulata*). Globular and composed of a dense corky substance, containing a single larval cell that is easily detached from the surrounding portions. Smooth or rough externally and of a light straw color, usually tinted with red. Diameter 10 to 14 mm.

Habitat. Colorado.

The gall very much resembles that of *Holcaspis globulus* but the flies are very different. The types are with Prof. C. P. Gillette and in the American Museum of Natural History.

***Holcaspis persimilis* Ashmead.**

Holcaspis persimilis ASHMEAD, Proc. U. S. Nat. Mus., Vol. XIX, 1896, p. 126; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 54.

Female. Head, antennæ, thorax and legs brown, and pubescent. Vertex of head, and streaks on the thorax black. Antennæ rather long, 13-jointed. Head and thorax punctate. Parapsidal grooves obsolete anteriorly. Anterior pair of grooves, extending backward to more than half the length of the mesothorax. Lateral grooves long. Pleuræ punctate, pubescent. Abdomen black, pubescent at the sides basally; apices of the short terminal segments dull rufous. Spine of ventral valve long and hairy. Wings hyaline, veins blackish brown, areolet distinct, surrounding veins delicate, except the outer vein which is thick and angulated, cubitus open at base; vein at base of radial cell angulated. Length 4 mm.

Gall. (Plate VIII, Figs. 15, 16.) On the twigs of black jack oak (*Quercus marylandica*). Rounded, hard, rugose externally, with raised lines and ridges. Otherwise similar in structure to other *Holcaspis* galls. Diameter 7 mm.

This species is unknown to me. The types of the single adult and gall are in the United States National Museum; the habitat is unknown. According to Ashmead the adult may be known from the congeners by the angulated outer vein of the areolet.

***Holcaspis bassetti* Gillette.**

Holcaspis bassetti GILLETTE 27th Rep. Agricul. Mich., 1888, p. 472, fig. 2; Psyche, Vol. V, 1889, p. 215, fig. 2; Proc. Iowa Acad. Sci., 1890, p. 54; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 53.

Holcaspis bassetti DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 55.

Female. Head cinnamon brown, median line of face and vertex dark brown to black; occiput and ocelli black; clypeus and border of epicranium black; mandibles black at tip and base; finely rugose with short hairs. Antennæ 13-jointed brown black, first and second joint rufous. Mesothorax black, with a red brown line outside of the parapsidal grooves, this line extends and connects with a reddish brown patch on each side of the anterior portion of the thorax. Pleuræ finely rugose, hairy and without a shining area. Parapsidal grooves begin midway on the thorax and extend back to the scutellum where they are widely separated. A little forward to these grooves the two parallel smooth lines arise and extend forward to the collar. On each side near the base of the wings is a smooth black line that runs to the scutel-

lum. Scutellum black, reddish brown at tip, evenly rugose. Abdomen pitchy black, ventral spine brown, hairy, first segment with minute, grayish hairs. Legs reddish brown. Wings pale yellowish brown, hyaline, veins distinctly brown. Length 3 mm.

Gall. (Plate VIII, Figs. 6, 7.) Singly or in clusters from two to about thirty, closely crowded together on the twigs of swamp white oak (*Quercus platanoides*) and "shingle oak (*Quercus imbricaria*). Green and soft when fresh and often tinged with pink. Hard, woody and brown, when old and dry. Monothalamous, rounded or irregular at base, broadly attached to the twig, and gradually drawn out into a more or less prominent point at the apex, which is sometimes curved. Larval cell at base of gall and somewhat pointed at the end toward the twig.

Habitat.—Ohio; Michigan; Iowa.

The types are with Prof. C. P. Gillette.

***Holcaspis sileri* Bassett.**

Holcaspis sileri BASSETT, Trans. Am. Ent. Soc., Vol. XVII, 1890, p. 67; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 56; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 54.

Female. Dull dark reddish brown, except the abdomen which is black and shining. Thorax pubescent and punctate. Parapsidal grooves from scutellum half way to the collar, diverging. Anterior parallel lines somewhat more than half to the scutellum, distinct and smooth. Lateral lines deep. A short medium line from the scutellum, which does not reach forward to the parallel lines. Abdomen black, second segment pubescent at the sides. Legs dark reddish brown, tarsi darker, claws two toothed. Wings hyaline, veins slender, dark. Areolet small, cubitus not continuous to the first cross-vein.

Gall. (Plate VIII, Fig. 12.) Singly at the tip of twig of oak (*Quercus undulata*). Somewhat bud-shaped, ovate, or elongate. Attached by a broad base to the twig near the bud, pointed at the apex with part of a leaf growing from it or at the sides. Rough and apparently green when fresh, brown and pubescent when dry. Internally the gall is hard with the larval cell closely imbedded, but separated from the gall. Length about 9 mm. Width about 5 to 6 mm.

Habitat. Southern Utah.

The adult of this species has not been examined by me. It is in the collection of the American Entomological Society and two type galls are in the American Museum of Natural History.

***Holcaspis canescens* Bassett.**

Holcaspis canescens BASSETT, Trans. Am. Ent. Soc., Vol. XVII, 1890, p. 66; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 55; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 53.

Female. Head and thorax dark brownish, and less hirsute than *H. corallinus*. Legs almost resinous in appearance. Abdomen black and shining with a tinge of brown and the hairiness is confined to the sides of the second, third, and fourth segments, and is so very sparse, short and fine, as to escape observation unless highly

magnified. The parallel lines on the mesothorax are more widely separated than in *corallinus*. Lines over the base of each wing, darker, broader, and shining. Parapsidal grooves very inconspicuous. Wings with radial area large. Length about 4 mm.

Gall. In clusters on the branch of a species of dwarf oak (*Quercus* sp.) Rounded, hard, and woody, with a blunt spur at the apex. Resembling dwarf specimens of *Holcaspis duricoria*, though the surface is more hoary. Internally, there is a single larval cell, attached to the gall, but can be detached without breaking; around the cell there is a thin layer of rusty brown, and outside this a light gray color prevails. Diameter 10 mm.

Habitat. California.

The type is in the American Entomological Society.

***Holcaspis arizonica* Cockerell.**

Holcaspis arizonica COCKERELL, Can. Ent., Vol. XXXIV, 1902, p. 183.

Female. Antennæ 15-jointed, third joint longest. Head ferruginous. Thorax and abdomen piceous; margins of mesothorax and two spots on scutellum dull ferruginous. Legs bright ferruginous. Anterior tibiæ with an apical projection; anterior tibial spurs bent; claws of all the legs falciform, with a large triangular basal tooth. Outer parapsidal grooves failing anteriorly. Scutellum large, rounded, hairy and without grooves. Sides of thorax and abdomen, except the upper basal portion with much glittering white hair. Abdomen with a short ferruginous hairy projection beneath. Ovipositor not visible. Naked portion of abdomen smooth and polished, hairy portion minutely tessellate, with a tendency to oblique grooves, only visible with a compound microscope. Wings strongly clouded on apical half, nervures piceous, Areolet present. Length of body 3.50 mm. of wings 3.33 mm.; of antennæ 2 mm.

Gall. Attached to the base of the petiole of leaf of oak (*Quercus arizonica*). Globular, pale ochreous, not shining. There is a projecting point next to the place of insertion. Inside it is brown, fibrous, moderately dense, with at least two cells. Diameter 9 mm.

Habitat. Prescott, Arizona.

This species is unknown to me. According to T. D. A. Cockerell it is closely related to *Cynips sulcatus* Ashmead, but differs by its much darker color and infuscated wings, and seems to go best in *Holcaspis*. The type, according to Prof. T. D. A. Cockerell, is with the American Entomological Society.

***Holcaspis colorado* Gillette.**

Holcaspis colorado GILLETTE, Ent. News, Vol. IV, 1893, p. 210; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 53.

Female. "Black, shaded with rufous. Head dark rufous with parts bordering the mouth, middle portion of face and vertex black or nearly so; antennæ 13-jointed, black, third joint slightly longer than the fourth. Thorax rather coarsely punctured, and from each puncture arises a gray hair. The general color of the thorax is black, but there is a tinge of rufous upon the shoulders and between the parapsidal grooves;

parapsidal grooves black, and rather broad at the scutellum, but extending only about half way to the collar; median groove wanting, parallel lines extending back from the collar, distinct. Lines over the base of wings black, smooth and shining; scutellum grooved at base, rugose, sparsely haired, and darker in color than the mesothorax. Pleuræ densely punctured, the punctures giving rise to fine white hairs. Abdomen black, polished, second segment hardly covering more than one third of the dorsum; the abdomen is truncate and compressed laterally, the greatest depth from the dorsum to the venter being greater than the length. Wings hyaline, 4.2 mm. long; nervures black, but not heavy; areolet rather large. Feet blackish, tinged with rufous; tibiæ darker than femurs. Length 3.6 mm. (C. P. Gillette)."

Gall. In clusters on the twigs of a species of oak (*Quercus*, sp.). Globular and drawn out into a blunt point at the apex. Hard and woody and resembles small dark colored galls of *H. rugosa*. The substance is more dense than in *rugosa* and *gobulus* and the central cell does not separate from the cellular tissue. Length 10 mm. Width 8 mm.

Habitat. Colorado (Manitou).

This species is unknown to me and the type of the adult and gall are with Prof. C. P. Gillette. It was described from a single living female which was cut from a gall October 31, 1892.

Holcaspis cinerosa (Bassett).

Cynips cinerosa BASSETT, Can. Ent., Vol. XIII, 1881, p. 110.

Andricus cinerosus ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1884, pp. 295, 304; *ibid.*, Vol. XIV, 1887, p. 130; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 82; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 62.

Female. Head rufous, tips of mandibles black, finely punctate and covered with short grayish hairs. Ocelli black. Antennæ rufous tinged with black, hairy. Thorax rufous, anterior pair of median lines and space between these black. A black shade line on each side containing the shining groove at the base of each wing. This black shade terminates some distance before the anterior edge of the thorax; finely rugoso-punctate and covered with appressed grayish hairs. Parapsidal grooves distinct extending to about the middle of the mesothorax where they are widely separated. Anterior pair of parallel lines distinct, and extending to the middle of the mesothorax. Median groove from the scutellum short. Scutellum finely and evenly rugoso-punctate, rufous and covered with appressed grayish hairs; foveæ wanting. Abdomen reddish brown, pitchy brown black dorsally, or almost wholly pitch brown black; first segment, and anterior part of second segment with fine grayish hairs laterally. Legs brown, hairy, claws black. Wings hyaline, veins brown, second-cross vein infuscated. Cubitus disappearing before reaching the first cross-vein. Areolet large triangular. Anal vein broken before the middle. Length 3 to 4 mm.

Gall. (Plate VII, Fig. 10.) Singly or in clusters of two or three on the twigs of live oak (*Quercus virginiana*). Monothalamous. Globular with a distinct pointed nipple at the apex, and covered with a dense mealy grayish powder. Internally it is of a dense corky or cellular structure, containing a partly free central larval cell. Diameter 12 to 22 mm.

Habitat. Texas.

A distinct species, readily known by the dense grayish pubescence on the thorax and sides of the abdomen; clear hyaline wings with the cubitus of the primaries disappearing before reaching the first cross-vein. The gall is perfectly globular with a nipple at the apex and differs from all other known *Holcaspis* galls by the dense grayish powder covering it.

The types are in the American Entomological Society. A fine lot of galls of *H. cinerosa*, from Austin, Texas, were kindly sent to me by Mr. C. Hartman.

***Holcaspis corallina* Bassett.**

Holcaspis corallinus BASSETT, TRANS. AM. ENT. SOC., Vol. XVII, 1890, p. 66.

Holcaspis corallina DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 55; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 53.

Female. Reddish brown, antennæ brownish black, thickly covered with short silvery white hairs except a small spot on the dorsal ridge of the abdomen; the hairs on the antennæ and middle of the pleuræ are shorter and less conspicuous. Head somewhat paler than the thorax. Lines on the thorax darker than the general surface; two closely contiguous, smooth, parallel lines from the collar extending half way to the scutellum. Parapsidal grooves very widely separated at the scutellum, shallow and almost hidden by the appressed hairs and disappearing before reaching the middle of the mesonotum. Scutellum rounded, foveæ wanting. Abdomen more densely hairy than the remaining parts of the body. Legs somewhat paler than the body. Claws one-toothed. Wings hairy, veins dark, cubitus not quite reaching the first cross-vein; radial area open, basal vein angulated. Areolet small. Length 4 mm.

Gall. (Plate IX, Figs. 13, 14.) On twigs of a species of dwarf oak (*Quercus*, sp.) Coral-shaped, rounded with the surface irregularly and thickly studded all over with short, stumpy projections which differ in size. Reddish buff-colored when fresh and blackish when old; covered closely with a velvety pubescence. Internally the gall is yellowish brown and contains a single, attached, larval cell. Diameter 7 to 10 mm.

Habitat. California.

The types are in the American Entomological Society and type galls in the American Museum of Natural History.

***Holcaspis douglasi* Ashmead.**

Holcaspis douglasii ASHMEAD, PROC. U. S. NAT. MUS., Vol. XIX, 1896, p. 127.

Holcaspis douglasi DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 53.

Female. Reddish brown, abdomen sometimes nearly black, tibiæ and tarsi sometimes dark brown, pubescent. Anterior pair of lines and groove on each side at the base of the wing, on a black surface. Parapsidal grooves delicate, but distinct throughout. Anterior pair of lines from the collar and lateral groove at base of each wing distinct. Pleuræ shining, but punctate. Foveæ at base of scutellum, con-

fluent, not separated by a carina. Wings hyaline, pubescent, veins blackish, radius slightly incrassate at tip and the vein at the base of radial cell angulated. A discolored streak below the areolet and a large brownish mark below the middle of the radius in the apical cell. Length 2.6 to 3 mm.

Gall. (Plate VIII, Figs. 10, 11.) On the under side of the leaf of oak (*Quercus douglasi*) Brown and covered with a lilac gray bloom. Squash shaped, with many ridges surrounding the upper margin, being prolonged into irregular tubercles, usually from seven to ten in number. From the base to the upper margin the gall gradually increases in width. Internally it is hollow and with an egg-shaped partly attached larval chamber. Height 7 to 10 mm. Width at upper margin 6 to 10 mm.

Habitat. California (Marin Co.).

The gall of this species is very different in shape from that of other *Holcaspis*. It is somewhat of the shape of a diminutive squash and covered with a delicate lilac gray bloom which is easily rubbed off. The types are in the United States National Museum.

***Holcaspis truckeensis* Ashmead.**

Holcaspis truckeensis ASHMEAD, Proc. U. S. Nat. Mus., Vol. XIX, 1896, p. 127; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 54.

Female. Head and thorax punctate, brownish yellow, covered with glittering white pubescence. Antennæ yellowish brown, first and second joints black. Pleuræ and metathorax blackish, shining. Parapsidal grooves, anterior parallel grooves and lines over the base of the wings distinct. Scutellum yellowish brown, rugose. Abdomen yellowish brown, highly polished pubescent at sides of second segment; ventral spine, stout, hairy. Wings hyaline, veins brown. Areolet distinct, cubital cell open at base. Basal vein of radial cell only obtusely angular. Length, 3.4 mm.

Gall. (Plate VIII, Fig. 13.) On the terminal twig of oak (*Quercus chrysolepis* var. *vaccinifolia*). Irregular, inflated, hard, woody gall issuing from a slit in a terminal twig. Brown, somewhat smooth with transverse depressions, caused by the coalescence of several galls. Length about 25 mm. Width about 12 mm.

Habitat. California.

The types are in the United States National Museum.

***Holcaspis eldoradensis* sp. nov.**

Female. Head yellowish brown minutely punctate pubescent. Antennæ very slender, brown, darker toward the tip. Thorax yellowish brown, black along the parapsidal grooves and between the anterior parallel lines, pubescence pale. Parapsidal grooves deep, distinct, shining. Anterior parallel lines distinct and extending to about the middle of the mesothorax. Scutellum yellowish brown, finely and evenly rugose. Pleuræ yellowish brown, punctate. Abdomen yellowish brown, dark along the dorsum. Legs yellowish brown pubescent. Wings hyaline, veins brown. Length 3 mm.

Gall. (Plate IX, figs. 6, 7.) On the twigs of *Quercus kelloggii*. Hard woody and with the base broadly inserted in a slit on the branch. Rounded with the top

very much flattened. Sides pale brown, wrinkled, summit dark brown and rugose. Centrally is a single larval cell. Width 4–7 mm. Height about 4 mm.

Habitat: Sonoma County, California.

Type: One female and gall. Collection American Museum of Natural History.

***Holcaspis perniciosus* (Bassett).**

Cynips quercus mellaria RILEY, Am. Ent., Vol. III, 1890, p. 298; McCook, Honey Ant, 1882, p. 27, pl. iv, figs. 7–12 (galls only).

Holcaspis perniciosus BASSETT, Trans. Am. Ent. Soc., Vol. XVII, 1890, p. 68; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., Vol. XXIII, 1907, p. 465; WHEELER, Bull. Am. Mus. Nat. Hist., Vol. XXIV, 1908, p. 378, fig. 23.

Holcaspis perniciosus DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 56; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 54.

Holcaspis monticola GILLETTE, Ent. News., Vol. IV, 1893, p. 30; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 54.

Female. Head very dark rufous, face almost black in the middle; vertex black, finely rugose. Antennæ blackish brown, shining, minutely pubescent. Thorax dark pitchy brown or almost black, sometimes tinged with very dark reddish brown, finely punctate, sparsely pubescent. Parapsidal and anterior pair of grooves, distinct, but not prominent, lateral lines present. Scutellum, piceous, tinged with rufous, foveæ wanting. Abdomen pitchy brown black, first segment pubescent at sides. Legs dark reddish brown. Wings hyaline, veins brown. Areolet large. Length 2.50 to 3 mm.

Gall. (Plate IX, Figs. 8, 9.) In clusters on the twigs of oaks (*Quercus undulata* and *Quercus gambelii*). Monothalmous. Rounded with the apex more or less pointed or somewhat flattened, attached by a broad base to the twig which is enlarged into a shallow cup-like receptacle at the base of the gall. When fresh the gall is bright-colored, inclining to crimson or scarlet; when old, dark brown, hard, woody and containing a larval cell firmly imbedded in the rather hard cellular tissue. Smooth or slightly rough and sometimes with deep, irregular cracks. The adult escapes through an opening which it makes at the base of the gall. Diameter 5 to 8 mm.

Habitat. Colorado; New Mexico; Utah; Arizona.

A distinct species, redescribed as *Holcaspis monticola* by Prof. C. P. Gillette. Riley, in 1880, briefly described the galls under the name *Cynips quercus mellaria*. This name should not be accepted since it is based merely on the plant deformation. According to McCook the galls exude minute drops of a sweet, watery secretion which is collected by the honey ant (*Myrmecocystus hortideorum*). This liquid is eagerly collected by the ordinary workers, carried to their nests in their crops and fed to the repletes, and otherwise serving as food when other sources are exhausted.

The types of *H. perniciosus* are in the American Entomological Society, and those of *H. monticola* are with Prof. C. P. Gillette and the American Museum of Natural History.

Holcaspis succinipes (Ashmead).

Cynips q. succinipes ASHMEAD, Trans. Am. Ent. Soc., Vol. IX, 1881, p. xi.

Andricus succinipes ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 291;
DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 65.

Holcaspis succinipes ASHMEAD, Trans. Am. Ent. Soc., Vol. XIV, 1887, p. 132;
DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 56.

Female. Head brown, finely granulated, face covered with rather long whitish or yellowish white pubescence; ocelli black. Antennæ 13-jointed, reddish brown. Thorax reddish brown rather densely pubescent, two black subdorsal vittæ, extending from the middle of the mesothorax forward to the collar in a straight line with the outer ocelli. Parapsidal grooves distinct, brownish black, two small grooves between these and just back of the black vittæ, converging toward the scutellum not quite reaching the hinder edge; the grooves are blackish and also the surface of the mesothorax a short distance along the edge. Scutellum rounded, punctate, pubescent. Abdomen dark brown, smooth, basal part of second segment reddish. Legs amber colored. Wings hyaline, veins brownish and strongly defined, radial area nearly closed. Areolet closed, the closing vein very pale. Length 3.50 to 4 mm.

Gall. (Plate VII, Fig. 11; Plate VIII, Fig. 14.) In clusters of from five to twenty or more crowded around a terminal twig or branch of live oak (*Quercus virginiana*). Globular or bud-shaped with a broad flattened or excavate base. Yellowish brown, with a surface like buckskin, becoming blackish brown with age. Internally hard, and tough with a single hard, smooth larval cell. Diameter 3 to 6 mm.

Habitat. Florida.

The types are in the United States National Museum.

Holcaspis ficigera (Ashmead).

Cynips q. ficigera ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. vi.

Loxaulis ficigera ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296.

Holcaspis ficigera ASHMEAD, Trans. Am. Ent. Soc., Vol. XIV, 1887, p. 132;
DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 56; BRIDWELL, Trans. Kan. Ac. Sci., Vol. XVI, 1899, p. 204. DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 54.

Female. Reddish brown, abdomen dark brown above. Anterior pair of parallel lines on the thorax and groove on each side at the base of the wing, black. Head and thorax finely rugosely punctate, pubescent; parapsidal grooves distinct extending forward to middle of mesothorax. Scutellum evenly rugose, pubescent foveæ wanting. Abdomen pubescent at base. Legs yellowish brown or rufous, pubescent. Wings hyaline, veins fine brown, cross-veins rather heavy. Areolet large. Length 2.50 to 3 mm.

Gall. (Plate VIII, Figs. 2, 3, 4, 5.) In clusters thickly crowded together around a twig of live oak (*Quercus virginiana*) compressing each other and shaped accordingly. Outwardly they resemble compressed figs and are of a yellowish brown color. When not compressed they are rounded with a flattened base. Hard and woody and covered with a felt-like substance. Internally the gall is hard and surrounds a

smooth kernel, which is plainly visible on detaching a gall, a part of the kernel being imbedded, and when detached it leaves an indentation in the twig.

Habitat. Georgia; Florida; Kansas.

The types are in the United States National Museum.

***Holcaspis spongiosa* (Karsch).**

Diplolepis spongiosus KARSCH, Zeitsch. Gesam. Naturwiss., Vol. V, 3d ser. 1880, p. 295, pl. vi, figs. 5, 5a.

Cynips spongiosa DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 76; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 60.

Cynips q. ficula BASSETT, Can. Ent., Vol. XIII, 1881, p. 75.

Loxaulis ficula ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296.

Holcaspis ficula ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 303; *ibid.*, Vol. XIV, 1887, pp. 132, 135; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 56; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 54.

Female. Head cinnamon red with a black line on the face, finely punctate, pubescent. Antennæ blackish. Thorax black, reddish along the parapsidal grooves, and at the sides, finely punctate and pubescent. Parapsidal grooves distinct and extending forward to about the middle of the mesothorax. Anterior pair of parallel lines very indistinct or wanting. Lateral lines distinct, black. Pleuræ reddish brown. Scutellum rugose, foveæ wanting. Abdomen reddish brown, darker dorsally. Legs dark reddish brown, pubescent. Wings hyaline, veins slender, dark brown. Cubitus disappearing before reaching the first cross-vein. Areolet small. Length 2.50 to 4 mm.

Gall. (Plate IX, Figs. 10, 11.) Closely compressed clusters surrounding the twigs of burr oak (*Quercus macrocarpa*), post oak (*Quercus minor*) and *Quercus chapmani*. The individual galls in these clusters assume a variety of forms, by reason of their lateral pressure which they exert upon each other. The normal form would undoubtedly be that of a regular cone attached by its apex to the branch. The galls form a rounded or elongated or globular symmetrical mass, somewhat resembling that of pressed figs. Externally they are thin-shelled and are usually covered with a rust-colored velvety substance which mostly disappears from the outward and exposed surface. Internally it is composed of a soft spongy reddish brown substance and contains a hard larval cell not separable from the spongy substance. The masses are usually very closely compact giving them the appearance of being one large gall, with fissures and depressions indicating the individual galls. Length 25 to 50 mm. Diameter 16 to 38 mm.

Habitat. Georgia; Florida; Texas.

The types of *H. ficula* are in the American Entomological Society and the American Museum of Natural History, and the types of *H. spongiosus* are probably in the Berlin Museum.

The description and figure of the gall of *H. spongiosus* agree with that of *H. ficula*. The adult was briefly described from a broken example and Dr. Karsch stated that the same together with the characteristic gall would serve to recognize the species.

Holcaspis brevipennata Gillette.

Holcaspis brevipennata GILLETTE, Ent. News, Vol. IV, 1893, p. 31; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 53.

Female. Head yellowish rufous, very finely rugose, hairy, median elevation smooth. Ocelli black. Antennæ yellowish rufous from the first to sixth joints, remaining joints blackish. Thorax yellowish rufous, sparsely covered with short hairs, very finely rugoso-punctate, parapsidal grooves distinct, entire; anterior pair of grooves wanting. Pleuræ very finely rugoso-punctate, with a large shining area. Scutellum coarsely but evenly rugose with two foveæ at the base, hairy. Abdomen yellowish rufous above, piceous beneath. Legs yellowish rufous, hairy. Wings extending a little beyond the abdomen, hyaline. Veins black, transverse and radial ones heavy. In the apical cell are two dusky patches. Areolet wanting. Length 3 mm.

Gall. (Plate IX, Figs. 4. 5.) Attached singly to the under side and always near the margin of the leaves of oak (*Quercus undulata*). Globular thin shelled; straw color more or less stained with rusty brown. The central cell is held in place by a rather abundant growth of fine radiating fibres, more or less branched toward their outer ends. Diameter 11 to 18 mm.

Habitat. Manitou, Colorado. (Gillette.)

The gall somewhat resembles that of *Dryophanta polita*, but is more fragile and thin shelled. The wings of the adult extend slightly beyond the abdomen. The parapsidal grooves are continuous and the anterior part of parallel lines are wanting. The types of the adults and galls are with Prof. C. P. Gillette and in The American Museum of Natural History.

Holcaspis centricola (Osten Sacken).

Cynips quercus centricola OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. I, 1861, p. 58.

Cynips q. centricola, OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. I, 1862, pp. 246, 247.

Cynips centricola OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. IV, 1865, pp. 339, 345, 347, 350.

Loxaulis centricola ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296.

Holcaspis centricola ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 304; *ibid.*, Vol. XIV, 1887, p. 127; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 55; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, pp. 53, 82; COOK, 29th Rep. Dept. Geol. Nat. Hist. Indiana, 1904 (1905), p. 836, fig. 28.

Female. Head black, sometimes with a red spot on each side of the ocelli, finely and evenly rugoso-punctate, sparsely hairy; palpi and mandibles rufous. Antennæ black, with short pale hairs. Thorax black, subopaque, finely and evenly rugoso-punctate, with yellowish pubescence. Parapsidal grooves start from the humeri and converge toward the scutellum, where they are scarcely separated. Median groove from scutellum absent. Anterior parallel lines distinct and reaching the middle of the thorax. On each side above the base of the wings is a smooth, broad,

shining line, the anterior end of which is very near the parapsidal groove. This line runs backward to the scutellum. Scutellum black or rufous, finely rugose, pubescent, and with slight traces of a median line; foveæ at base flat and rugose at bottom; on each side of these there is a tuft of yellowish hairs. Abdomen pitchy brown black, smooth, shining, pubescent at base. Ventral spine brown with long yellow hairs. Legs pitchy black, coxæ, knees, and tarsi brown, pubescent. Wings hyaline, radial and cross-veins very broad and stout, dark brown; radial vein slightly arched; second transverse vein angular. Areolet large, triangular. Anal vein with a brown cloud before the middle. A brown cloud near the base of the apical cell and a few brown marks towards the tip of the wing. Length 2.50 to 3.50 mm.

Gall. (Plate IX, Fig. 1.) On the undersides of the leaves of post oak (*Quercus minor*). Globular flattened at base and attached to the leaf by a small nipple. Thin shelled white, sometimes tinged with pink and covered with a white pubescence, this being the character of the under side of the leaf of the post oak. Internally there is a central kernel which is held in position by numerous, white, silky filaments, radiating from the kernel to the shell of the gall. Diameter 15 to 20 mm.

Habitat. Washington, D. C.; New Jersey; Indiana.

A very distinct species and different from all other known *Holcaspis*. In the adult the parapsidal grooves extend from the shoulders, where they are widely separated, backward to the scutellum, where they are close together. The line at base of wing is curved anteriorly and the wings are clouded apically and on the anal vein. The gall superficially resembles that of *Amphibolips inanis*. It is possible that the species may not belong to the genus *Holcaspis* and I place it in this genus tentatively. The types are in the Museum of Comparative Zoölogy at Cambridge, Mass.

***Holcaspis maculipennis* Gillette.**

Holcaspis maculipennis GILLETTE, Can. Ent., Vol. XXVI, 1894, p. 236; COCKERELL, Trans. Kansas Acad. Sci., Vol. XVI, 1899, p. 213; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 54.

Female. Head rufous, middle of face sometimes black, finely punctate and pubescent. Antennæ black. Thorax finely rugose, black, rufous along the parapsidal grooves and sides, over the bases of the wings. Sometimes wholly rufous or marked with black between the anterior pair of grooves and the lateral lines, pubescent. Parapsidal grooves distinct and extending from the collar to the scutellum where they converge and are not widely separated. Anterior pair of lines extending to a little beyond the middle of the mesothorax. Median groove from the scutellum faintly indicated, abbreviated. Pleuræ finely rugose, rufous, sometimes marked with black. Scutellum finely rugose, rufous; foveæ indistinct. Abdomen varying from rufous to piceous, wholly pubescent. Legs rufous to piceous. Wings long, hyaline; veins brown with pale brown clouds and numerous, small brown spots in the apical cell. Length 3 to 5 mm.

Gall. (Plate IX, Figs. 2, 3.) Single or in clusters of two or more, on the upper and under sides of the leaves of oak (*Quercus wrightii*, *Quercus undulata*, *Quercus*

garryana), and probably other allied species. Globular, yellowish, composed of a thin outer shell and a single larval cell held in place by radiating fibres. Yellowish brown when dry and covered with darker brown rounded spots. Diameter 15 to 35 mm.

Habitat. New Mexico; California; Oregon.

The maculation of the wings is unlike that of any other species of *Holcaspis*, and the species may be readily known by the continuous parapsidal grooves. The gall resembles that of *Amphibolips inanis*.

The types are with Prof. C. P. Gillette. I have bred several specimens of the flies from galls collected at Portland, Oregon, by Dr. E. O. Hovey.

***Holcaspis chrysolepidis* Ashmead.**

Specimens of galls (Plate VIII, figs. 8, 9) under this name were given to me by W. H. Ashmead, and other specimens of the galls are in the United States National Museum. They are from Placer County, California, and occur on the twigs of *Quercus chrysolepis*. The adult has not been described.

EXPLANATION OF PLATES.

PLATE VII.

- | | |
|---------|--|
| Fig. 1. | <i>Holcaspis globulus</i> Fitch. |
| " 2. | " <i>globulus</i> Fitch. |
| " 3. | " <i>globulus</i> Fitch, inside view. |
| " 4. | " <i>omnivora</i> Ashmead. |
| " 5. | " <i>omnivora</i> Ashmead, double galls. |
| " 6. | " <i>omnivora</i> Ashmead, double gall. |
| " 7. | " <i>omnivora</i> Ashmead, inside view. |
| " 8. | " <i>rubens</i> Gillette. |
| " 9. | " <i>rubens</i> Gillette. |
| " 10. | " <i>cinerosa</i> Bassett. |
| " 11. | " <i>succinipes</i> Ashmead. |

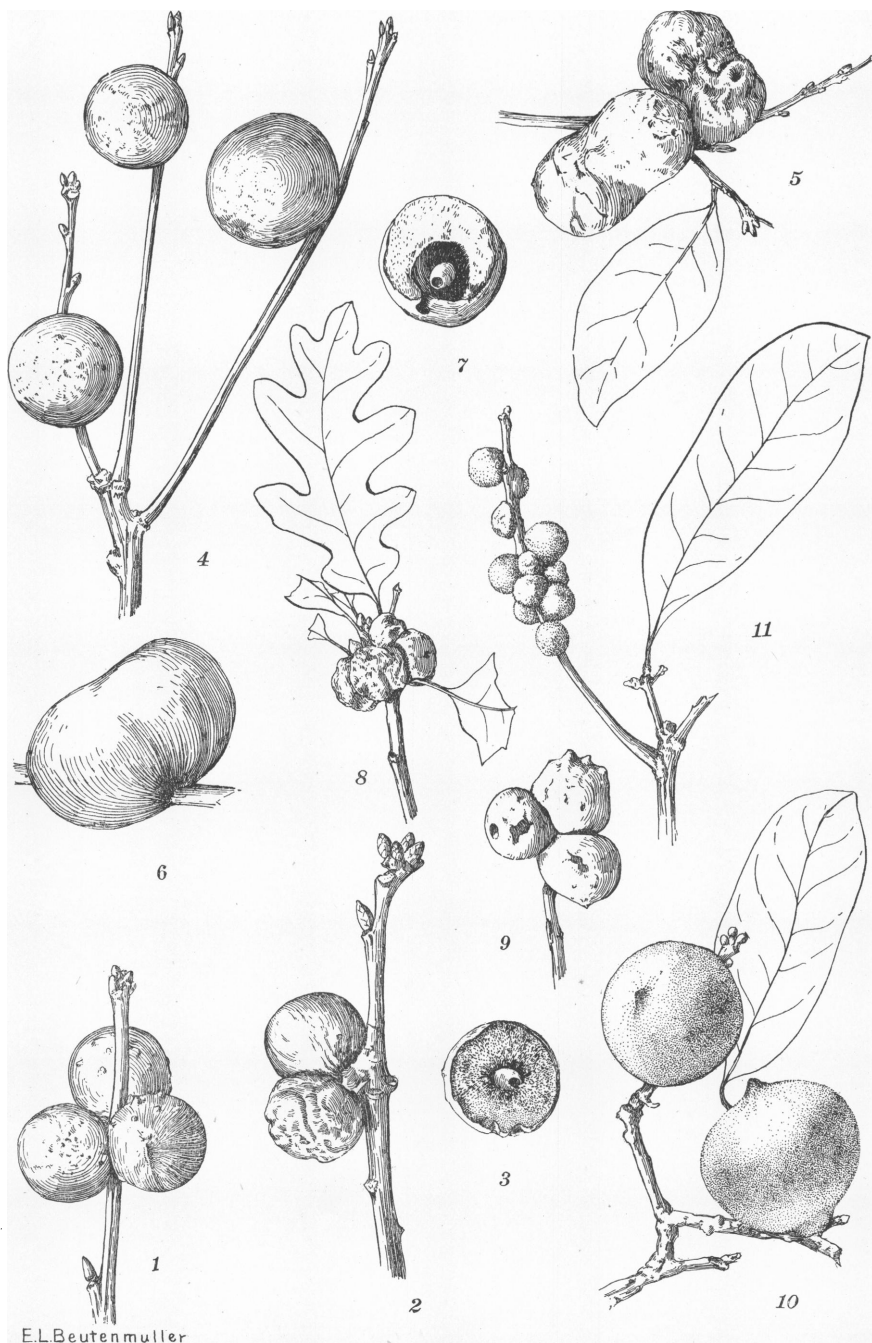
PLATE VIII.

- | | |
|---------|---|
| Fig. 1. | <i>Holcaspis mamma</i> Walsh. |
| " 2. | " <i>ficigera</i> Ashmead. |
| " 3. | " <i>ficigera</i> Ashmead. |
| " 4. | " <i>ficigera</i> Ashmead, single gall. |
| " 5. | " <i>ficigera</i> Ashmead, inside view. |
| " 6. | " <i>bassetti</i> Gillette. |

- Fig. 7. *Holcaspis bassetti* Gillette, inside view.
 " 8. " *chrysolepidis* Ashmead.
 " 9. " *chrysolepidis* Ashmead, inside view.
 " 10. " *douglasi* Ashmead.
 " 11. " *douglasi* Ashmead.
 " 12. " *sileri* Bassett.
 " 13. " *truckeensis* Ashmead.
 " 14. " *succinipes* Ashmead.
 " 15. " *persimilis* Ashmead.
 " 16. " *persimilis* Ashmead.

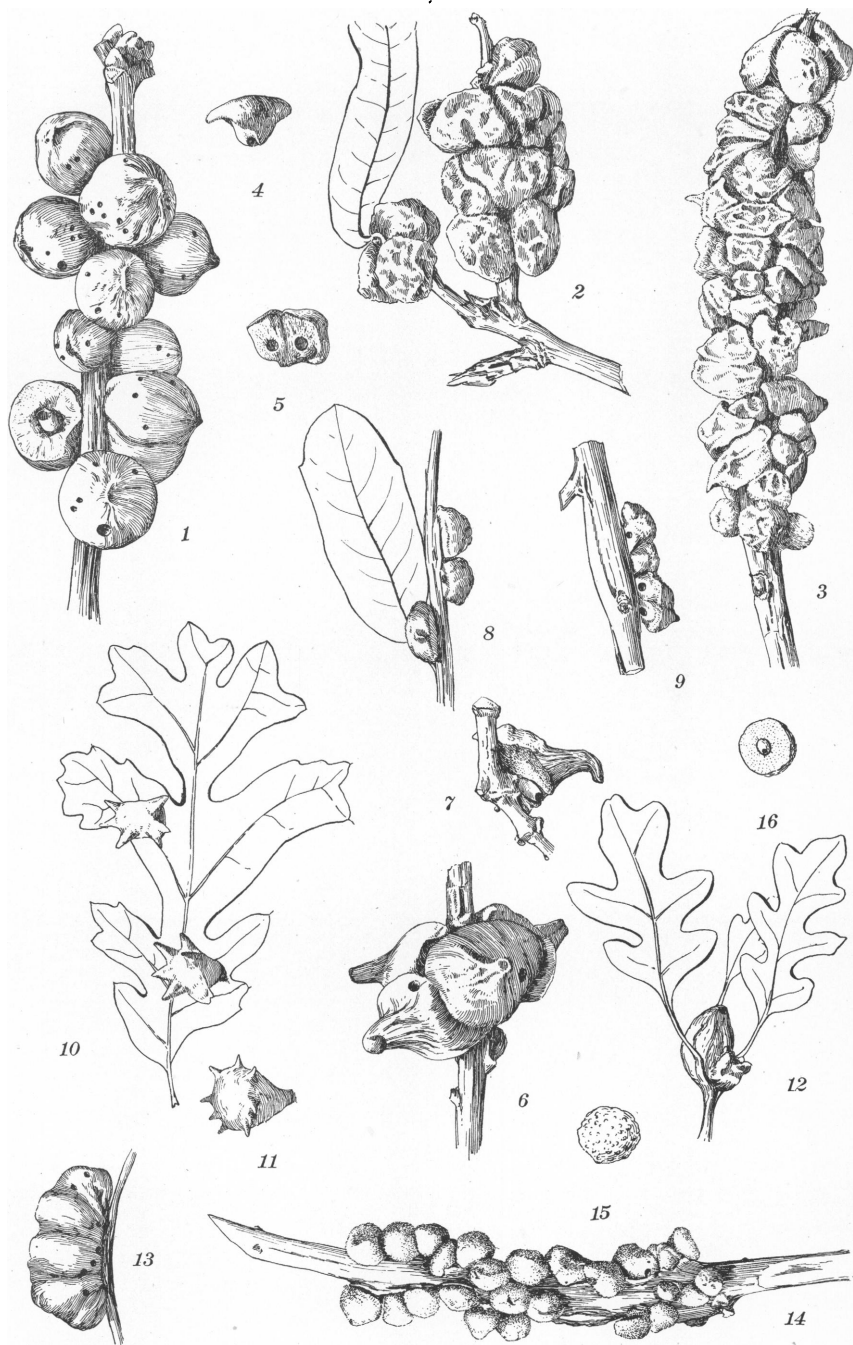
PLATE IX.

- Fig. 1. *Holcaspis centricola* Osten Sacken.
 " 2. " *maculipennis* Gillette, inside view.
 " 3. " *maculipennis* Gillette.
 " 4. " *brevipennata* Gillette.
 " 5. " *brevipennata* Gillette, inside view.
 " 6. " *eldoradensis*, sp. nov.
 " 7. " *eldoradensis*, sp. nov. side view.
 " 8. " *perniciosa* Bassett.
 " 9. " *perniciosa*, inside view.
 " 10. " *spongiosa* Karsch.
 " 11. " *spongiosa* Karsch, inside view.
 " 12. " *rugosa* Bassett.
 " 13. " *corallina* Bassett.
 " 14. " *corallina* Bassett, inside view.



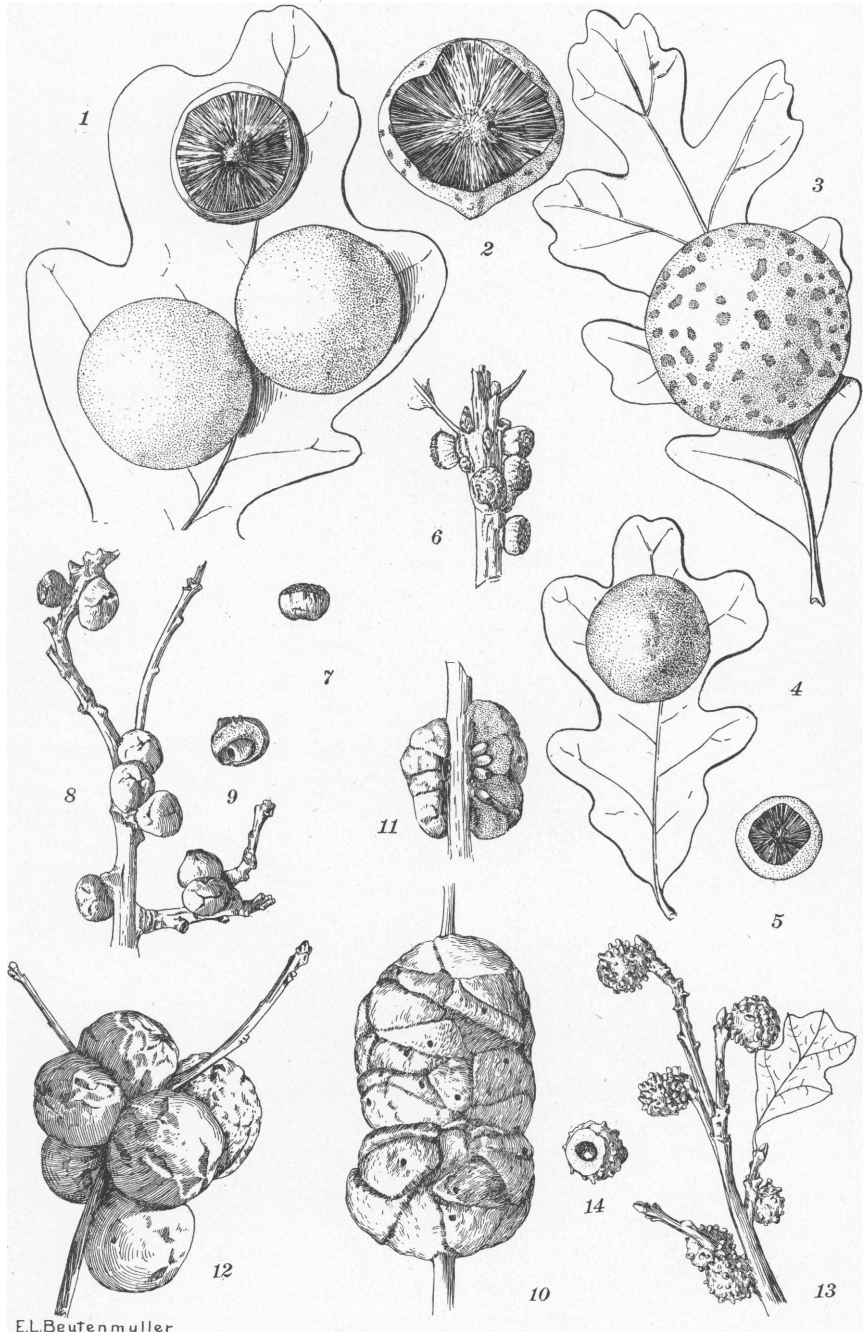
E.L. Beutenmüller

GALLS OF HOLCASPI.



E.L. Beutenmuller

GALLS OF HOLCASPIS.



GALLS OF HOLCASPI.

